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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Hyung-Jun Kim

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10/19/2004

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PROFESSIONAL LIMITED LIABILITY COMPANY
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EXAMINER

LEWIS, MONICA

ART UNIT

PAPER NUMBER

2822

DATE MAILED: 10/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/015,757

Applicant(s)

KIM, HYUNG-JUN

Examiner

Monica Lewis

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 August 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4-8,10,12,13 and 15-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4-8,10,12,13 and 15-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 December 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. This action is in response to the amendment filed August 3, 2004.

Response to Arguments

2. Applicant's arguments with respect to claims 1, 4-8, 10, 12, 13 and 15-17 have been considered but are moot in view of the new ground(s) of rejection.

Specification

3. The amendment filed 8/3/04 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: "dummy fine line patterns having a sub-micron width."

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1, 4-8, 10, 12 and 13 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains the following subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention: a) "being formed in one layer" (See Claims 1 and 5). Claims 4, 7-8, 10, 12 and 13 depend directly or indirectly from a rejected claim and are, therefore, also rejected under 35 U.S.C. 112, first paragraph for the reasons set above.

Drawings

6. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the “pad pattern, said fine line pattern and said connection pattern of each of said plurality of metal wire patterns being formed in one layer” must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled “Replacement Sheet” in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1, 4-8, 10, 12, 13 and 15-17 are rejected under 35 U.S.C. 103(a) as obvious over Murakami (U.S. Patent No. 6,320,262) in view of Kim et al. *Investigation of Aluminum CMP to Apply to Sub-Quarter Micron DRAM Devices* and Kim et al. (U.S. Patent No. 5,534,728).

In regards to claim 1, Murakami discloses the following:

- a) at least one pad pattern (10) (For Example: See Figure 1);
- b) a fine line pattern (13 and 14) (For Example: See Figure 1);
- c) at least one connection pad pattern (11 and 12) for electrically connecting the pad pattern to the fine line pattern (For Example: See Figure 1);
- d) pad pattern, said fine line pattern and said connection pad pattern of each of said plurality of metal wire patterns being formed in one layer (For Example: See Figure 1); and
- e) a width of said connection pad pattern being in a range between a width of said pad pattern and the width of said fine line pattern (For Example: See Figure 1).

In regards to claim 1, Murakami fails to disclose the following:

- a) a fine line pattern with a width of less than 1 μ m.

However, Kim et al. ("Kim") discloses the use of a wire which has a sub-quarter micron width (For Example: See Page 471 Lines 14 and 15). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device

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of Murakami to include that the width of a wire that has a sub-quarter micron width as disclosed in Kim because it aids in preventing corrosion (For Example: See Pages 473-476).

Additionally, since Murakami and Kim are both from the same field of endeavor (semiconductors), the purpose disclosed by Kim would have been recognized in the pertinent art of Murakami.

b) an area of the fine line pattern being more than 1% of a total area of a plurality of metal wire patterns.

Although Kim et al. ("Kim") does not explicitly state that the fine line pattern is more than 1% of a total area of said plurality of metal wire patterns, the Examiner is permitted to give a claim the broadest reasonable interpretation consistent with the specification. See MPEP § 2111. The claim fails to describe a definitive area of the fine line pattern in relation to the overall layout of the metal wire patterns. Additionally, it is true that Kim does not explicitly state that the area of the fine line pattern is more than 1% of a total area of plurality of metal wire patterns, however it is clear that Kim shows a fine line pattern-metal wire pattern orientation in the same manner as claimed. It would have been obvious to one of ordinary skill in the art to allocate the claimed pattern ratio to establish electrical communication between the chip and peripheral components since such technology was well known in the art at the time the invention was made.

Additionally, since Murakami and Kim are both from the same field of endeavor (semiconductor wiring), the purpose disclosed by Kim would have been recognized in the pertinent art of Murakami.

In regards to claims 4 and 7, Murakami discloses the following:

a) wire is made of aluminum or copper (For Example: See Column 4 Line 38).

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In regards to claim 5, Murakami discloses the following:

- a) pad patterns (For Example: See Figure 1);
- b) a fine line patterns (For Example: See Figure 1);
- c) connection pad patterns for electrically connecting the pad pattern to the fine line pattern (For Example: See Figure 1);
- d) pad pattern, said fine line pattern and said connection pad pattern of each of said plurality of metal wire patterns being formed in one layer (For Example: See Figure 1); and
- e) a width of said connection pad pattern being in a range between a width of said pad pattern and the width of said fine line pattern (For Example: See Figure 1).

In regards to claim 5, Murakami fails to disclose the following:

- a) patterns with a width of less than $1\mu\text{m}$.

However, Kim discloses the use of a wire which has a sub-quarter micron width (For Example: See Page 471 Lines 14 and 15). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Murakami to include that the width of a wire that has a sub-quarter micron width as disclosed in Kim because it aids in preventing corrosion (For Example: See Pages 473-476).

Additionally, since Murakami and Kim are both from the same field of endeavor (semiconductors), the purpose disclosed by Kim would have been recognized in the pertinent art of Murakami.

- b) a dummy fine line pattern.

However, Kim discloses the use of a dummy line (1', 2', 3' and 4') (For Example: See Abstract). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Murakami to include the use of a

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dummy line as disclosed in Kim because it aids in preventing corrosion (For Example: See Abstract).

Additionally, since Murakami and Kim are both from the same field of endeavor (semiconductor wiring), the purpose disclosed by Kim would have been recognized in the pertinent art of Murakami.

c) an area of the dummy fine line patterns, which are connected to the pad patterns, being less than 1% of a total area of said plurality of metal wire patterns and also being less than a value obtained by dividing an area of the main fine line patterns by said total area.

Although Kim does not explicitly state that an area of the dummy fine line patterns, which are connected to the pad patterns are less than 1% of a total area of said plurality of metal wire patterns and less than a value obtained by dividing an area of the main fine line patterns by said total area, the Examiner is permitted to give a claim the broadest reasonable interpretation consistent with the specification. See MPEP § 2111. The claim fails to describe a definitive area of the dummy fine line pattern in relation to the overall layout of the metal wire patterns.

Additionally, it is true that Kim does not explicitly state that an area of the dummy fine line patterns, which are connected to the pad patterns are less than 1% of a total area of said plurality of metal wire patterns and less than a value obtained by dividing an area of the main fine line patterns by said total area, however it is clear that Kim shows a dummy fine line pattern-metal wire pattern orientation in the same manner as claimed. It would have been obvious to one of ordinary skill in the art to allocate the claimed pattern ratio to establish electrical communication between the chip and peripheral components since such technology was well known in the art at the time the invention was made.

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Additionally, since Murakami and Kim are both from the same field of endeavor (semiconductor wiring), the purpose disclosed by Kim would have been recognized in the pertinent art of Murakami.

In regards to claim 6, Murakami fails to disclose the following:

a) the dummy fine line patterns are formed parallel with the main fine line patterns at a distance of a width of the main fine line pattern.

However, Kim discloses that dummy fine line patterns are formed parallel with the main fine line patterns (1, 2, 4 and 5) at a distance of a width of the main fine line pattern (For Example: See Abstract and Figure 4). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Murakami to include dummy fine line patterns formed parallel with the main fine line patterns at a distance of a width of the main fine line pattern as disclosed in Kim because it aids in preventing corrosion (For Example: See Abstract).

Additionally, since Murakami and Kim are both from the same field of endeavor (semiconductor wiring), the purpose disclosed by Kim would have been recognized in the pertinent art of Murakami.

In regards to claim 8, Murakami fails to disclose the following:

a) the dummy fine line patterns do not form or contribute to any electric circuit.

However, Kim discloses the use of a dummy line (For Example: See Abstract). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Murakami to include the use of a dummy line as disclosed in Kim because it aids in preventing corrosion (For Example: See Abstract).

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Additionally, since Murakami and Kim are both from the same field of endeavor (semiconductor wiring), the purpose disclosed by Kim would have been recognized in the pertinent art of Murakami.

In regards to claim 10, Murakami fails to disclose the following:

a) the plurality of metal wire patterns further include dummy pad pool patterns, to which the dummy fine line patterns are connected, said dummy pad pool patterns and said dummy fine line patterns being electrically disconnected from the main fine line patterns and the main pad patterns.

However, Kim discloses the plurality of metal wire patterns further include dummy pad pool patterns, to which the dummy fine line patterns are connected, said dummy pad pool patterns and said dummy fine line patterns being electrically disconnected from the main fine line patterns and the main pad patterns (For Example: See Abstract and Figure 4). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Murakami to include the use of a dummy line as disclosed in Kim because it aids in preventing corrosion (For Example: See Abstract).

Additionally, since Murakami and Kim are both from the same field of endeavor (semiconductor wiring), the purpose disclosed by Kim would have been recognized in the pertinent art of Murakami.

In regards to claim 12, Murakami discloses the following:

a) the plurality of metal wire patterns further include connection pad patterns which electrically connect the main pad patterns to the fine line patterns, said connection pad patterns being included in said total area (For Example: See Figure 1).

In regards to claim 13, Murakami fails to disclose the following:

a) the total area is represented by $A_p + A_c + A + d$, where, 'd' represents the area of the dummy fine line patterns, 'A_p' represents an area of the main pad patterns, 'A_c' represents an area of the connection pad patterns and 'A' represents the area of the main fine line patterns.

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Although Kim does not explicitly state that the total area is represented by $A_p + A_c + A + d$, the Examiner is permitted to give a claim the broadest reasonable interpretation consistent with the specification. See MPEP § 2111. While it is true that Kim does not explicitly state the total area is represented by $A_p + A_c + A + d$, it is clear that Kim shows the following in the same manner as claimed: a) a dummy fine line pattern; b) main pad pattern; c) connection pad pattern; and d) main fine line pattern. It would have been obvious to one of ordinary skill in the art to allocate the claimed area to establish electrical communication between the chip and peripheral components since such technology was well known in the art at the time the invention was made.

Additionally, since Murakami and Kim are both from the same field of endeavor (semiconductor wiring), the purpose disclosed by Kim would have been recognized in the pertinent art of Murakami.

In regards to claim 15, Murakami discloses the following:

- a) pad patterns (For Example: See Figure 1);
- b) a fine line patterns (For Example: See Figure 1);
- c) connection pad patterns for electrically connecting the pad pattern to the fine line pattern (For Example: See Figure 1);
- d) pad pattern, said fine line pattern and said connection pad pattern of each of said plurality of metal wire patterns being formed in one layer (For Example: See Figure 1); and
- e) a width of said connection pad pattern being in a range between a width of said pad pattern and the width of said fine line pattern (For Example: See Figure 1).

In regards to claim 15, Murakami fails to disclose the following:

- a) patterns with a width of less than $1\mu\text{m}$.

However, Kim et al. ("Kim") discloses the use of a wire which has a sub-quarter micron width (For Example: See Page 471 Lines 14 and 15). It would have been obvious to one having

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ordinary skill in the art at the time the invention was made to modify the semiconductor device of Murakami to include that the width of a wire that has a sub-quarter micron width as disclosed in Kim because it aids in preventing corrosion (For Example: See Pages 473-476).

Additionally, since Murakami and Kim are both from the same field of endeavor (semiconductors), the purpose disclosed by Kim would have been recognized in the pertinent art of Murakami.

b) a dummy fine line pattern.

However, Kim discloses the use of a dummy line (For Example: See Abstract). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Murakami to include the use of a dummy line as disclosed in Kim because it aids in preventing corrosion (For Example: See Abstract).

Additionally, since Murakami and Kim are both from the same field of endeavor (semiconductor wiring), the purpose disclosed by Kim would have been recognized in the pertinent art of Murakami.

c) an area of said dummy fine line patterns, which are connected to the pad patterns, being formed to be less than 1% of a total area of said plurality of main metal wire patterns according to a formula, $(d/(A_p+A_c+A+d)*100)<1\%$ and also being less than a value obtained by dividing an area of the main fine line patterns by said total area, which is represented by A_p+A_c+A+d , according to a formula, $(d/(A_p+A_c+A+d) < A/(A_p+A_c+A+d)$ where, 'd' represents the area of the dummy fine patterns, 'A_p' represents an area of the main pad patterns, 'A_c' represents an area of the connection pad patterns and 'A' represents the area of the main fine line patterns.

Although Kim does not explicitly state an area of said dummy fine line patterns, which are connected to the pad patterns, being formed to be less than 1% of a total area of said plurality of main metal wire patterns according to a formula, $(d/(A_p+A_c+A+d)*100)<1\%$ and also being less than a value obtained by dividing an area of the main fine line patterns by said total area,

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which is represented by $A_p + A_c + A + d$, according to a formula, $(d/(A_p + A_c + A + d)) < A/(A_p + A_c + A + d)$ where, 'd' represents the area of the dummy fine patterns, 'A_p' represents an area of the main pad patterns, 'A_c' represents an area of the connection pad patterns and 'A' represents the area of the main fine line patterns, the Examiner is permitted to give a claim the broadest reasonable interpretation consistent with the specification. See MPEP § 2111. The claim fails to describe a definitive area of the dummy fine line pattern in relation to the overall layout of the metal wire patterns. Additionally, it is true that Kim does not explicitly state that an area of the dummy fine line patterns, which are connected to the pad patterns are less than 1% of a total area of said plurality of metal wire patterns and less than a value obtained by dividing an area of the main fine line patterns by said total area, however it is clear that Kim shows a dummy fine line pattern-metal wire pattern orientation in the same manner as claimed. It would have been obvious to one of ordinary skill in the art to allocate the claimed pattern ratio to establish electrical communication between the chip and peripheral components since such technology was well known in the art at the time the invention was made.

Additionally, since Murakami and Kim are both from the same field of endeavor (semiconductor wiring), the purpose disclosed by Kim would have been recognized in the pertinent art of Murakami.

In regards to claim 16, Murakami fails to disclose the following:

a) the dummy fine line patterns are formed parallel with the main fine line patterns at a distance of approximately the width of the main fine line pattern.

However, Kim discloses that dummy fine line patterns are formed parallel with the main fine line patterns at a distance of a width of the main fine line pattern (For Example: See Abstract and Figure 4). It would have been obvious to one having ordinary skill in the art at the time the

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invention was made to modify the semiconductor device of Murakami to include dummy fine line patterns formed parallel with the main fine line patterns at a distance of a width of the main fine line pattern as disclosed in Kim because it aids in preventing corrosion (For Example: See Abstract).

Additionally, since Murakami and Kim are both from the same field of endeavor (semiconductor wiring), the purpose disclosed by Kim would have been recognized in the pertinent art of Murakami.

In regards to claim 17, Murakami fails to disclose the following:

- a) a large dummy pad pattern connected to the dummy fine line pattern.

However, Kim discloses a large dummy pad pattern connected to the dummy fine line pattern (For Example: See Abstract and Figure 4). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Murakami to include a large dummy pad pattern connected to the dummy fine line pattern as disclosed in Kim because it aids in preventing corrosion (For Example: See Abstract).

Additionally, since Murakami and Kim are both from the same field of endeavor (semiconductor wiring), the purpose disclosed by Kim would have been recognized in the pertinent art of Murakami.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monica Lewis whose telephone number is 571-272-1838. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian, can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722 for regular and after final communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

ML

October 14, 2004


AMIR ZARABIAN
SUPERVISORY PATENT EXAMINER
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